



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/607,525	06/25/2003	Valery M. Dubin	42P16623	4832
8791	7590	06/24/2005	EXAMINER	
BLAKELY SOKOLOFF TAYLOR & ZAFMAN 12400 WILSHIRE BOULEVARD SEVENTH FLOOR LOS ANGELES, CA 90025-1030			KIELIN, ERIK J	
			ART UNIT	PAPER NUMBER
			2813	

DATE MAILED: 06/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/607,525

Applicant(s)

DUBIN, VALERY M.

Examiner

Erik Kielin

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 April 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-76 is/are pending in the application.
- 4a) Of the above claim(s) 25-35 and 39-76 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 18-24 and 36-38 is/are rejected.
- 7) ☒ Claim(s) 6-17 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 6/25/03 9/20/04 1/24/05
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of the invention of Group II, species A (II-A) with claims 1-24 and 36-38 indicated to read thereon in the reply filed on 21 April 2005 is acknowledged.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-5, 18-24 and 36, 37 are rejected under 35 U.S.C. 102(e) as being anticipated by US 6,628,053 B1 (Den et al.).

Regarding **claim 1**, Den discloses a method comprising

forming a sacrificial layer 21 (called a “conductive surface”) made of, *inter alia*, titanium (col. 9, lines 36-40) – as further limited by instant **claim 21**-- on a substrate 20 (Fig. 8A);

forming an aluminum metal layer 26 –as further limited by instant **claim 20**-- on the surface of the sacrificial layer 21 (Fig. 8A; col. 9, lines 23-29);

anodizing the aluminum metal layer 26 to form a porous aluminum oxide (alumina) layer 22 –as further limited by instant **claim 20**—in a solution of oxalic acid, using a positive voltage of about 40 V (Fig. 8A; col. 9, lines 23-29) --as further limited by instant **claims 22, 23, and 24**;

Art Unit: 2813

removing excess metal oxide from the pores 53 of the porous metal oxide layer 22 prior to forming the carbon nanotubes 24 (col. 12, lines 44-47) –as further limited by instant **claim 2**;

depositing a catalyst 23 of, *inter alia*, iron (Fe), cobalt (Co), or nickel (Ni), in the pores 53 of the porous metal oxide layer 22 prior to forming carbon nanotubes 24 in the pores (Fig. 8C; col. 10, lines 7-36) –as further limited by instant **claims 4 and 5**; and

forming carbon nanotubes using CVD –as further limited by instant **claim 19**-- in the pores 53 of the porous metal oxide layer 22 to a height extending above an upper surface of the porous metal oxide layer (Fig. 8D; col 10, lines 37-67) –as further limited by instant **claim 18**.

Regarding **claim 3**, Den discloses embodiments wherein the pores extend through the porous metal oxide layer (Figs. 5A, and 6A-6C).

Regarding **claim 36**, Den discloses a method comprising,

forming a sacrificial layer 21 (called a “conductive surface”) on a substrate 20 (Fig. 8A);

forming a layer of porous material 22 on the sacrificial layer 19 (Fig. 8B);

depositing a catalyst 23 of, *inter alia*, iron (Fe), cobalt (Co), or nickel (Ni), in the pores 53 of the porous metal oxide layer 22 prior to forming carbon nanotubes 24 in the pores (Fig. 8C; col. 10, lines 7-36) –as further limited by instant **claim 37**; and

forming carbon nanotubes 24 in pores 53 of the layer of porous material 22 (Figs. 8C-8D; col. 9, lines 14-35).

4. Claim 36 is rejected under 35 U.S.C. 102(e) as being anticipated by US 6,741,019 B1 (Filas et al.).

Filas discloses a method comprising,

forming a sacrificial layer 19 on a substrate 18 (Fig. 1D);
forming a layer of porous material 22, 24 on the sacrificial layer 19 (Fig 1E); and
forming carbon nanotubes (col. 5, lines 39-40) in pores of the layer of porous material
(Fig 1E; col. 10, lines 14-35).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Filas.

The prior art of Filas, as explained above, teaches all of the features except for “dissolving” the sacrificial layer 19. Inasmuch as the desire in Filas is to use the sacrificial layer to separate the nanotube/metal oxide composite from the substrate 18 by peeling, the use of dissolving the sacrificial layer would be an obvious variation to peeling the sacrificial layer. There exists no evidence of record suggesting that “dissolving” provides an unexpected result over peeling the sacrificial layer—especially since the result is the same, i.e. releasing the nanotube/metal oxide composite from the substrate.

Allowable Subject Matter

7. Claims 6-17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 6, the prior art does not teach or suggest, in combination with the other claimed limitations, that the carbon nanotube/metal oxide composite structure is separated from the substrate. While Filas teaches that the carbon nanotube/metal oxide structure is separated from the substrate by peeling the sacrificial layer, it would be at best obvious to try this step in the method of Den. In this regards, Den leaves the carbon nanotube/metal oxide composite intact to form the electron emitter structure and also uses a different sacrificial layer. Den uses a metal as the sacrificial layer while Filas uses Teflon or wax. Separating the composite from the Den structure would undermine the principle of operation therein.

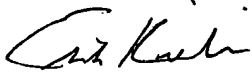
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erik Kielin whose telephone number is 571-272-1693. The examiner can normally be reached from 9:00 - 19:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr. can be reached on 571-272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2813

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Erik Kielin
Primary Examiner
June 22, 2005